THE McGILL DAILY

Vol. 73 N°. 36 Wednesday 16 November, 1983 Montréal, Québec

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TODAYS

Women's Union special discussion on women's oppression with reknowned underground feminist Christine Parlour. Schizophrenia and Old Mother Hubbard in Union 423 at 18h00. General business at 17h00.
Armenian Students' Association weekly get-together from 12-15h00 in Union 403.
Réunion de l'Equipe de l'Edition Française du McGill Daily, 15h00, Gert's II (sous-sol du Union Building sur McTavish).
Russian and Slavic Studies Students' Association Conversation Hour at 16h00 in Bronfman 666.
Debating Union Exhibition Debate: Be it resolved that god is an American. Roscoe Lounge in RVC at 19h30. Refreshments.
Indian Students' Association presents two films, Rangbirangi at 12h00, Satykam at 15h00. Union 107-108. Free admission.
Seis aspectos de Ortega y Gasset in Spanish at Leacock Council Room at 15h00.
McGill Film Society presents Hour of the Wolf at 20h00 in L132.
Contemporary Jazz Dance Class Union Ballroom at 18h30. For information, 286-9757.
Québec Youth Parliament information session in the lobby 14-15h00. Events include Nov. 19 conference and session at the National Assembly, Dec. 26-30. For information, call Russel Copeman (482-6625).
McGill Foster Parent's Plan meets at 17h30 in the Union. New members welcome.
Radio McGill Fast Eddie, the radio renegade, and the rest of the gang invite you to listen to "Concepts and Considerations." 19h00-20h00. This week: Rain.
Redpath Hall Organ Recital by Monique Gendron at 1°h15. Three works by Alain (d. 1940).
Pollack Hall Jéan-Pierre Noiseux, recorder, voice, darboukhal; Rafik Samman, voice, lute, percussion; Hank Knox, harpsichord. Medieval, Renaisssance, Baroque music and recorder improvisation. 20h00. (free).
McGill Christian Fellowship Professor Tom Wright on The Parables of Jesus at 18h30 in Diocesan College, 3473 University.
Sister Anne's Prayer Group Green Room, Newman Centre, 3484 Peel at 19h30. 392-6711.
Kabbalah Esoteric views on Judiaism with Rabbi Ronnie Fine. Union 425, 12h15-13h30.

Jewish Philosophy "The Deed or the Intention" with Rabbi Ronnie Fine, 19h00-20h30. Chabad House, 3424 Peel.
Christian Meditation 12h00 with Benedictine Oblate Derek Smith in Green Room, Newman Centre, 3484 Peel. 392-6711.

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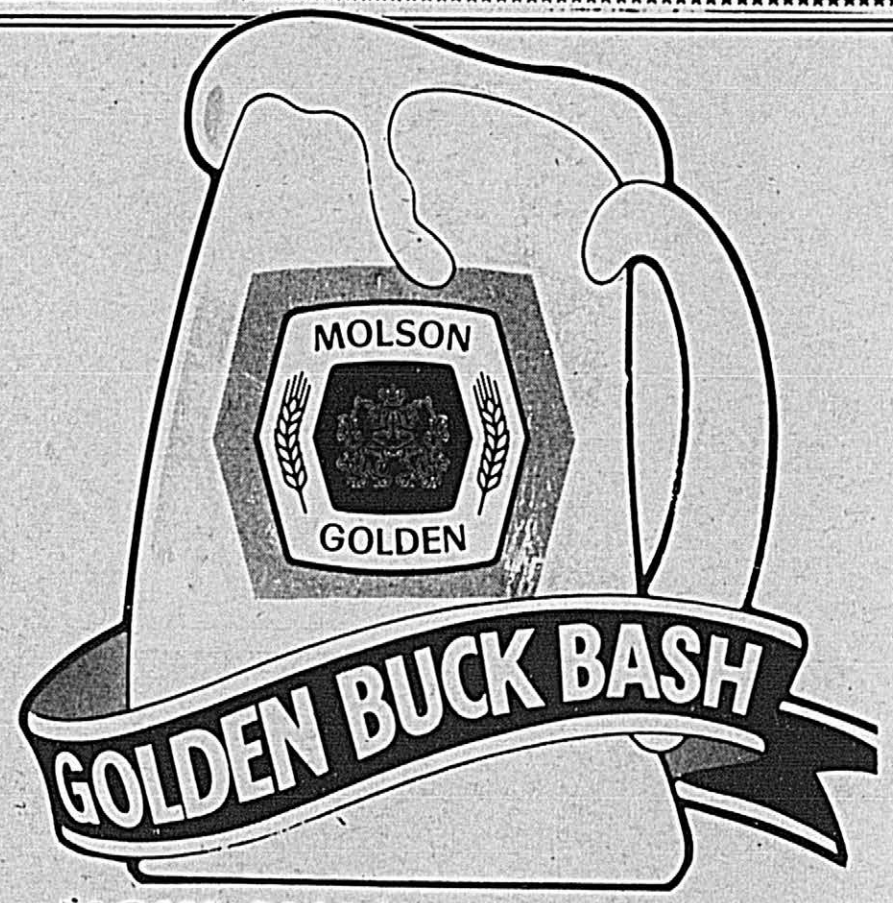

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NASA is not quite alone

by Mark Steen

Having weathered a Golden Fleece award and, last year, a cut off of funds, the National Aeronautics and Space Administration (NASA)'s Search for Extra-terrestrial Intelligence (SETI) program is back on its feet.

This spring, the centre piece of the program — a multichannel analyser to scan 74,000 radio channels simultaneously for evidence of non-natural signals — will go on line. Confident that funding will continue, NASA has a five-year research and development plan that will eventually expand that capability to eight million channels.

The program's recent financial troubles had seemed to kill SETI once and for all. Senator William Proxmire (who in 1977, had awarded SETI one of his golden fleece prizes for projects representing the biggest waste of taxpayers' money) succeeded in attaching an amendment to NASA's appropriation for fiscal year 1983, forbidding the agency to spend any of its funds on SETI. NASA spent a year shutting the operation down, only to reopen it after a visit from Carl Sagan, who apparently persuaded the senator to mute his objections. NASA will spend $1.5 million on SETI this year.

Critisism from within the astronomical community, however, persists. The latest row was set off by a letter by Dr. Frank Tipler of Harvard University which appeared in *Science* last month. Tipler blames Carl Sagan arguing that the SETI radio search will have "profound implications for our view of the universe and ourselves," whether the results are positive or negative.

According to Tipler, "a negative result would probably not convince supporters of SETI that extra-terrestrial civilizations do not exist. They could simply argue that advanced civilizations generally abandon inefficient radio transmissions like ours after a short time...SETI will only become a science when its proponents tell us what observations will convince them to assume that we are alone."

Tipler's criticisms did not impress SETI proponents attending the American Astronomical Society meeting in Boston last week. Dr. Jill Tarter of the University of California, Berkeley said, "Tipler's arguments never did have validity"; Dr. Frank Drake of Cornell University called them "a lot of baloney". In fact, Drake said, "there's never any way to prove the negative in an any scientific experiment."

SETI supporters also pointed to the National Academy of Sciences study last spring on priorities in astronomical research (the Field Committee Report) which endorsed a modest SETI effort and the establishment of a committee on extra-terrestrial life by the generally staid International Astronomical Union (IAU) as evidence that they have the astronomical community behind them. Drake said he has been "deluged with requests" from IAU members seeking to join the committee since its establishment last August.

Nonetheless, the underlying question in Tipler's recent critisism may have hit a raw nerve. SETI proponents seem painfully aware of the limitations inherent in the current research plan. Even with the full eight million channel capacity, the analyser will cover a spectrum of only 8 MHz at one time. Each channel is one Hz wide in order to screen out natural astronomical phenomena which have bandwidths of at least 1 kHz.

But even with restraints imposed by natural noise (which interferes with signals at wavelengths longer than 10 meters or so) and by thermal radiation (which interferes at wavelengths shorter than 5 cm) leaves a useful listening band 1000 times broader than the 8 MHz capacity of the analyser.

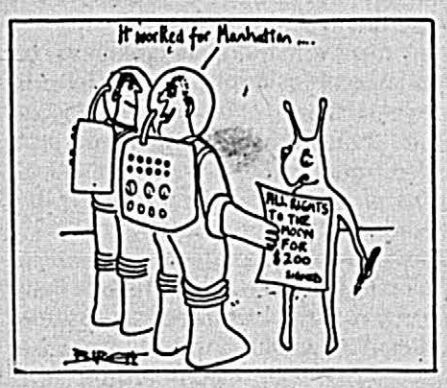
Similarly, limiting candidate stars to those nearby and those similar to our Sun leaves millions to be studied.

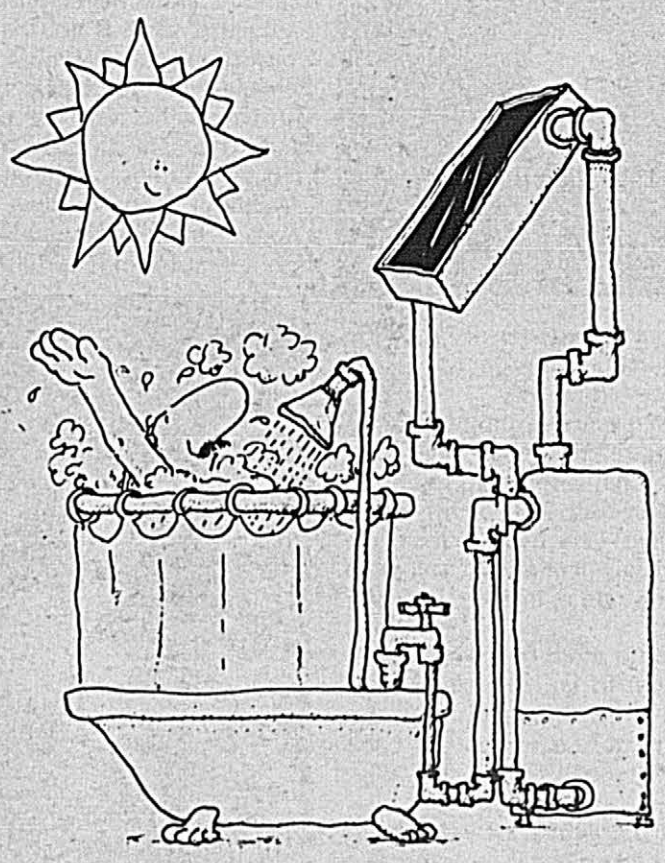
It will always be easy to argue that the lack of a positive result is due to having looked in the wrong place. It's easy to continue on what may really be a wild goose chase.

Another difficulty SETI may face is some foot dragging, even on the part of enthusiasts — particularly those who happen to be observatory directors. As SETI researcher Dr. Stuart Bowley of Berkeley said, "the intrinsic problem is that you must take over a radio telescope to conduct the search."

This takes away limited observation time from an observatory for a project that, as Bowley readily admits, has an exceedingly small chance of success.

And for all the claims that SETI has achieved respectability within the astronomical community, the general scientific community remains sceptical. The National Science Foundation has no official policy on SETI research, but refers enquiries to the NASA program.





Who needs nukes? Turn on the sun!

by David Eisenberg

In an age when nonrenewable energy resources are ever dwindling and nuclear power is too enshrouded with controversy to become a viable alternative, solar energy is becoming more popular.

The National Research Council's experimental solar energy house, situated at Ottawa's Rideau Falls, is attracting up to 2000 visitors a week, some from as far away as Brazil and South Africa. The solar house presents ways of extracting power from the sun and wind. Consisting of a well insulated building, the solar house is roughly equivalent to a three bedroom home in power needs. While it is hooked up to the electric power lines, it only draws on them to supplement the energy gathered by a windmill, 14 solar collectors, and a strip of solar cells, all mounted on the roof.

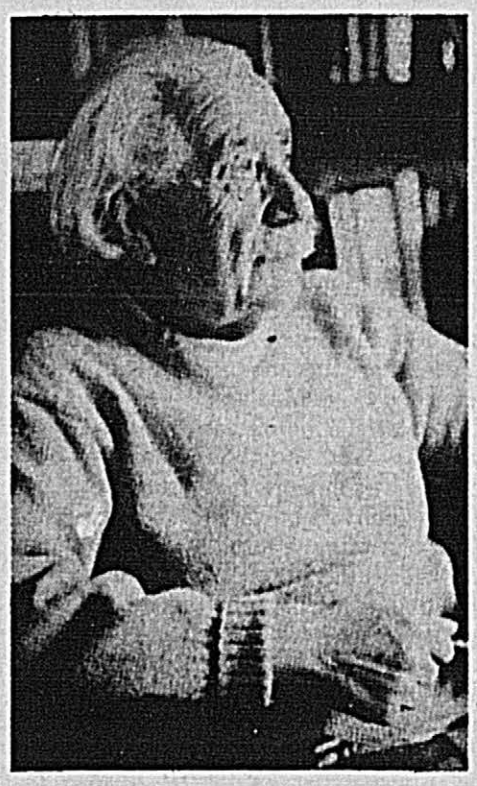
Inside the building, visitors can see and feel these devices at work, tapping from sunshine and the wind the heat to warm rooms and water, and the electricity to run a radio, television and tape-deck and lights.

The house also has a windmill on the roof, shaped like a large kitchen mixer. Unlike traditional windmills with propellers that turn around a horizontal axis like a circus Ferris Wheel, this one has curved blades that turn on a vertical axis like a Merry-Go-Round.

One of the advantages of the National Research Council windmill is that it spins regardless of which direction the wind blows from. The wind is harnessed to generate an alternating current that powers lights in the building. When the current is not needed in the house, it is distributed to electric power lines for use elsewhere in the city.

This renewable energy exhibit, which was jointly funded by Energy, Mines and Resources Canada, Public Works Canada and the National Research Council, is open to the public seven days a week between 10 a.m. and 4:30 p.m.

Take a trip on a beam of light



by Ann Loewen

The name Einstein - what images does it conjure up in your mind? The atomic bomb, $E=mc^2$, an almost incomprehensible genius - true, all of these, and yet there is so much more. Albert Einstein came at a time in the history of physics when some of its fundamental theories were ripe for being shaken up, and that is just what he did.

Perhaps one of the most remarkable things about some of his ideas is the fact that many are not based on complicated experimental proof or burdensome mathematics. Rather, many of the implications of his Special Theory of Relativity are exercises of the intellect that do not require any rigorous scientific background.

The one concept that must be understood in order to appreciate Special Relativity is that of a frame of reference. This can be grasped by imagining an everyday situation.

Suppose you are standing on a beach, watching a boat pass by. The boat is travelling due East, at a speed of 20 kilometers per hour (km/h). On the deck of the boat a person is walking towards the front of the boat, that is, also due East. She is carrying a pedometer, which says that she is travelling at a speed of 5 km/h.

Now, how fast is this person moving? If you were sitting on the deck of the boat, you would say 5 km/h. But you aren't - remember, you're on the beach. So, to you, she appears to be moving with her own speed plus that of the boat. That is, to you, she is travelling 25 km/h due East.

So the concept of a frame of reference becomes very important. If I say a person on a ship is travelling at a certain speed, I must also specify if that speed is relative to the boat or to the earth. This is the principle of relativity.

Early physicists like Galileo Galilei and Sir Isaac Newton were aware of this relativity principle and applied it when laying down the rules of what we now consider "classical" physics. But they assumed that an object's length or the time it takes for an event to occur would be the same regardless of the frame of reference.

Within the limits of their knowledge, the theories of Galileo and Newton were correct. But later discoveries were found to be inconsistent with some of the assumptions of classical physics.

In the late nineteenth century, many advances were made in the understanding of the nature of light. For one thing, the velocity (or speed) at which light travels was predicted and found to be correct experimentally.

The idea that light has a finite speed may seem strange at first. We turn on a light and the room is instantly filled with light. We see a distant flash of lightening and recognize that the event occurred at the same time that we saw it.

And yet, intuitively it can be understood that a finite period of time did elapse between the lightening flash and our seeing it. Light just travels so fast that we are not sensitive enough to detect the delay.

Among the ninteenth century physicists, the inevitable question arose: will the speed of light vary depending on the frame of reference of the observer?

Intuitively, physicists trained in classical physics answered "Yes, it will." So experiments were set up to test whether or not this hypothesis was correct.

As it turns out, it was not. Despite a great deal of ingenuity and careful experimentation, the speed of light was always found to have the same value, regardless of the frame of reference.

This posed a fundamental problem for physicists. Various proposals were put foreward, but none was adequate.

At this point, Einstein enters the picture. In 1905 he published a paper that had profound effects on scientific thinking; in it he proposed his Special Theory of Relativity.

The Special Theory has two basic assumptions. For our purposes, the second one will be considered. This second assumption is that light has a fixed, definite speed that is unchanged by either the speed of the light source or the observer.

Now, if you are about to raise an objection at this point - just wait. Yes, the second assumption does seem to contradict what has previously been stated. It says that whether you are watching a motionless object or one that is moving towards or away from you, the speed at which light rays travel in order to reach your eyes is the same in all cases.

But in order to explain the phenomenon of the constancy of light's speed, that assumption must be made. Thus once the speed of light is known, it is known in all frames of reference and "correction factors" for relative motion need never be made.

Now comes the interesting part — examining the predictions of the Special Theory of Relativity. Many of these are "thought experiments" where you must imagine yourself in a particular situation.

The first idea to be examined is that of simultaneity: what does it mean if one says that two events occurred at the same time?

Suppose you are standing on top of a long train, at the exact middle. Another person is standing in the middle of an identical train which is moving towards you. When the two trains are exactly adjacent, bolts of lightening strike both ends of your train. To you they appear to have struck at the same instant.

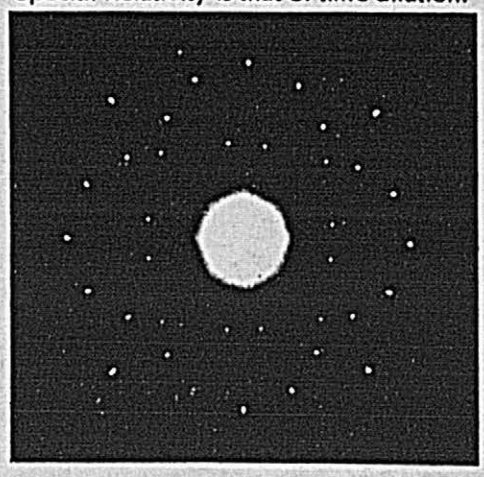
However, think now of the person on the other train. He is moving towards one end of your train and away from the other end.

The light from each end travels toward him with the same speed (remember the second assumption). But the light coming from the end of the train towards which he is travelling must cross a shorter distance, while the light from the other end must travel farther to "catch up" with the train rider.

Think about this carefully, and you will see that the second observer will not see the events occurring simultaneously as you did. Who is right? Did the two ends of the train get hit by lightening simultaneously or did they not?

The first answer is that neither one is "right"; the second question cannot be answered. The two frames of reference, yours and the other observer's, are equally valid. Events that are simultaneous to one observer may not necessarily be so to another.

Another interesting consequence of Special Relativity is that of time dilation.



For this thought experiment you must imagine yourself to be on earth watching a spaceship fly by.

Imagine that there is another person standing inside the spaceship. She shines a light that is reflected off a mirror on the opposite end of the space capsule. Using a very precise clock, she measures the time it takes for the light to leave the light source, hit the mirror and return to her.

Now, you are standing on earth watching this, but to you the situation is somewhat different. You observe the light travelling to the mirror and back again. But, you see this as the ship is flying past you.

So to you the light appears to have travelled a certain distance across the sky, in addition to the distance to the mirror and back.

Remembering that for both you and the spaceship traveller the light has the same speed, you can see that for you, the time it takes for the light to travel from the person in the spaceship, to the mirror, and back again is greater than the time that the spaceship traveller would have measured.

Following so far? If so, the conclusion resulting from all this will seem inevitable: time is measured to pass more slowly in a moving frame of reference when compared with your own.

If that seems strange, don't worry, because it should. The reason why this seems unacceptable is because it is far removed from everday life. Specifically, one must be travelling close to the speed of light to be aware of the effects described.

Other predictions of special relativity involve mathematical proofs. Some of these predictions are very interesting, such as length contraction (an object has a shorter length when moving than when at rest) and mass increase (the mass of an object increases with increasing speed).

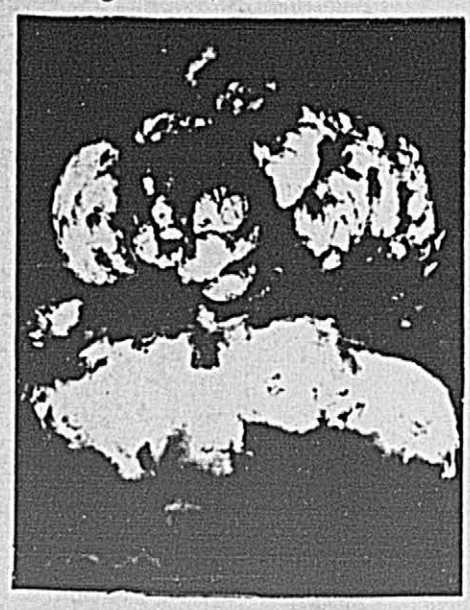
One final prediction of the special theory of relativity is that there is an upper limit to how fast an object can travel, and that upper limit is the speed of light. This is a result of the mass increase prediction; any object travelling at the speed of light would have an infinite weight, obviously a physical impossibility.

So how right was Einstein? It's all very well to sit and daydream about absurd situations, but how does one know it's not all pie-in-the-sky?

As it turns out, there is a large body of experimental evidence that supports the special theory of relativity. Obviously the "thought experiments" were not carried out; other, more practical means of testing the theory had to be devised.

Tiny sub-atomic particles have been accelerated to speeds near that of light and their mass increased as Einstein predicted it would. Incredibly precise clocks have been flown around the world, and were found to demonstrate the time dilation effect.

Albert Einstein is not the remote and untouchable genius whose ideas are accessible only to a select few as ingenious as he. On the contrary, the ideas that revolutionized some of science's firmest foundations are accessible to anyone willing to make the effort to imagine themselves travelling "on a light beam," as Einstein did.



The greatest nose in the universe

by Heather Peniuk

The people you're about to meet use chemicals like dimethylmorpholinophosphoramidiate. They'll tell you that working with trace concentrations in the parts-per-billion range is child's play, although they admit that the parts-per-trillion range requires a good night's sleep the day before. An enterprising bunch of chaps, they have invented a machine so sensitive it can tell whether a freight car has just been carrying oranges or tangerines. God sees the little sparrow fall, but these fellows can tell you what the worm that felled it ate for breakfast. These boys call themselves mass spectroscopists.

Perhaps, because mass spectroscopy is so exact, it is also difficult to describe. Mass spectroscopists go to parties very shyly, knowing the consequences if someone asks them what they do. Either they refuse to answer and look sullen or else they embark on a detailed explanation and watch their questioner's eyes glaze over.

Dr. Peter Dawson and Dr. Paul Reed, two mass spectroscopists with the National Research Council (NRC) department of physics, are developing a Canadian mass spectrometer second to none in the world.

The pairs collaborative efforts have produced a machine called the TAGA 6000, which Reed states, "is perhaps the most advanced single instrument that Canada has yet produced."

The TAGA is a rugged, mobile unit which can monitor pollutants, determine if a horse has received illegal drugs or decode the secret of a perfume.

Recently, TAGA was called upon to safeguard the public when a train derailed in Missausaga, Ontario and spilled chlorine and other poisons. Over 200,000 people were evacuated, but TAGA worked night and day to tell when the air was safe for them to return.

What is a mass spectrometer and why is it so sensitive? To explain this, let's go back to basics.

There are over one hundred chemical elements which can make up molecules. Suppose you want to find out what molecules make up an unknown sample. Chemistry has invented tests which tell molecular compositions, but most of these tests are fairly slow and destroy a large amount of the sample. If you could use another, more sensitive test that required only a small amount of material and a short operation time, you'd be at a great advantage.

This is the concept behind a mass spectrometer (MS). The first MS invented ionized molecules and accelerated them in a magnetic field so that the heavier ions deflected less than the lighter ions. This information was then relayed to a printer and a mass spectrum would be obtained of the ions plotted by weight with the largest ions plotted on one side and the heaviest on the other.

However, the first mass spectrometers were very cranky. They were more often being repaired then being used to collect data.

The cranky aspect is alleviated in TAGA by using a cluster of four electrically conducting rods to sort out and accelerate the sample ions which are shot through the cluster. The cluster is called a quadrapole and the rods interact to transmit only one molecular weight at a time. This simplifies detection of ions and makes the mass spectrometer more reliable.

TAGA uses a "target gas" such as nitrogen to bash the parent molecule. The target gas is introduced into the path of fast moving ions at right angles.

Compared to the ion's speed (10 kilometres/second), the target gas molecules hang in space like a slow moving driver who pulls into a freeway lane. Bang/And there go ionic windshields, fenders, and hubcaps for the quadrapole to sift through.

TAGA technicians, as a result of intricate software in the mass spectrometer's minicomputer can input commands which make the mass spectrometer attack the ion until the parent ion begins to break up. Technicians who operate TAGA say that getting the right amount of whack delivered to the parent ion still requires an artist's touch. Too heavy a hand will make the ion come apart all at once, with too little, it arrives at the detector in a mysterious clump.

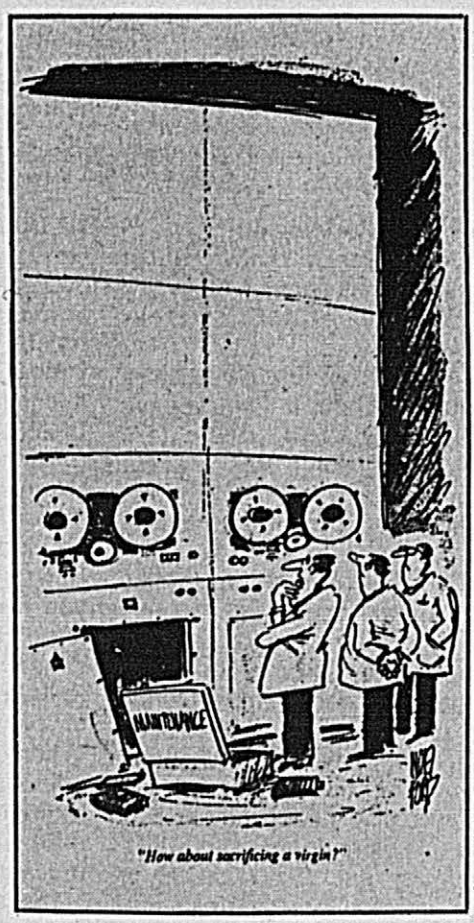
Now about that target gas. Why doesn't it rebound and plug up the quadrapole and the vacuum in which the ions fly?

Peter Dawson says they get rid of the gas popsickle in a very elegant way. "Once a week, we defrost."

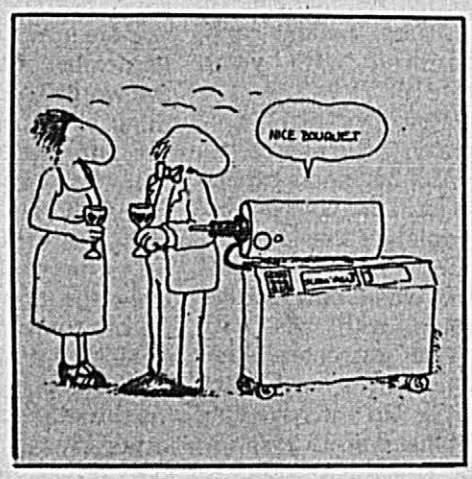
This in itself makes the TAGA 6000, a fantastic field machine. Independent of the gigantic vacuum pumps and water supplies that chain its competitors to imobile labs, the TAGA can hop a bus and go anywhere to sniff out excitement.

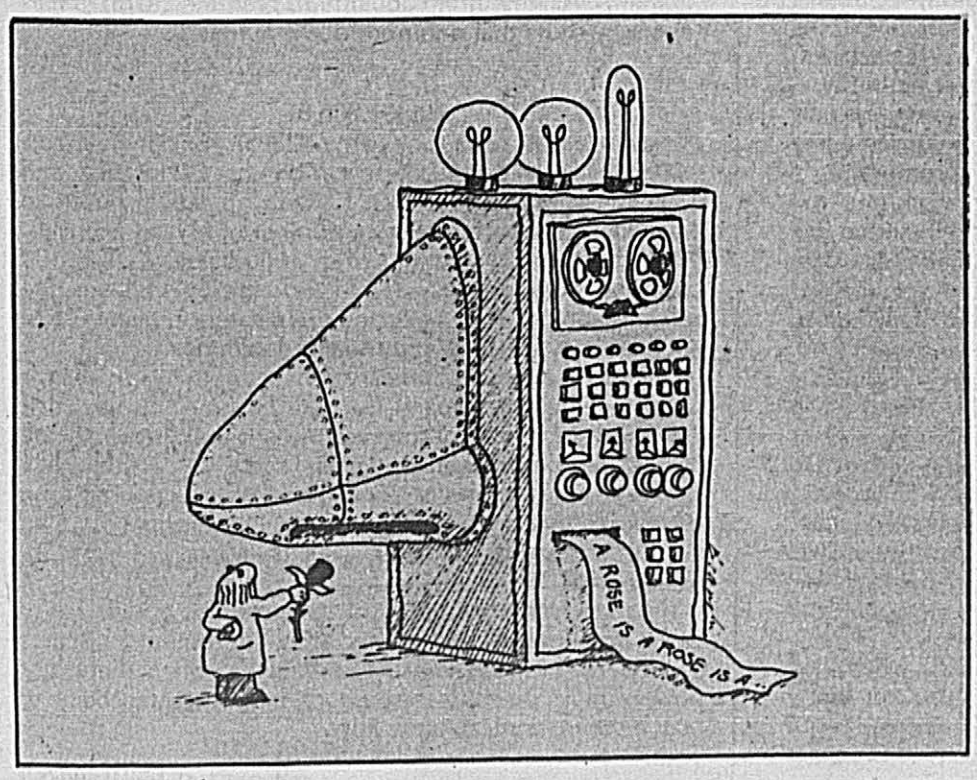
TAGA can also monitor stack emissions and shut down combustion within seconds of the release of the wrong kind of gas.

Says Dawson, "There's no other mass spectrometer like TAGA in the world. Right now I'd say we're working with the greatest nose in the universe."



"How about sacrificing a virgin?"





Ground control

by Robert Atkinson

When ground control asked at one point who was piloting Apollo 8 on its return journey from the moon, the answer came back from astronaut William Anders, "I think Isaac Newton is doing most of the driving right now."

Perhaps more than anything else, this reply reminds us that great technological achievements are always made upon the shoulders of many giants of science. The voyages to the moon (and back) as well as the Space Shuttle exploits could not have been made without applying the principles of gravity and motion, discovered by Sir Isaac Newton.

But then one must immediately include many other basic science discoveries made by similar geniuses of science. Indeed, not only Newton, but Archimedes, Galileo Galilei, Tycho Brahe, Nicolaus Copernicus, Johannes Kepler, Albert Einstein, Robert Goddard and many others are responsible for making the Apollo programs and the Space Shuttle possible.

When one considers all the scientific knowledge involved in space exploration such as launch and guidance systems, as well as communication, heat transfer, and life support, it is amazing to realise the number of applications made of the scientific facts and principles of physics. In our present age of high technology and increasingly deep space exploration, it is important that one has an opportunity to become familiar with the methods used by physicists as well gain an appreciation of their contibutions.

Amateur astronomy

by Tony Pocklington

You wanna know about amateur astronomy? Okay, I'll tell you about amateur astronomy.

First of all there's nothing amateur about it if you are enthusiastic and dedicated. Amateurs don't stay amateur for very long — either they survive and turn into something greater or else they take up a less demanding hobby-like stamp collecting.

I have been an enthusiastic amateur astronomer for a wild and wooly decade now. During that time I've experienced many of its delights first hand — watching the moons of gas giants play peek-a-boo; trying to split close double stars with a primary just .00000000083 of an inch too large; taking some of the world's worst photographs of the Moon; dropping heavy counterweights on frozen feet; dropping expensive eyepieces on fine Saskatchewan soil; convincing myself I cannot afford to buy the 373 new books on astronomy that come out every month.

You really wanna know about amateur astronomy?

What follows is not pretty. To begin with, I will shock some of you by saying that amateur astronomy is a tough, tough hobby. Now I'm not talking about the department store 17,000-power-imported-refractor-taken-out-in-the-backyard-once-a-year amateur astronomy. I'm talking about serious no holds barred stuff.

You've got dedicated talented people out there who break their backs to make diffraction limited optics and get them to you within a reasonable length of time.

Good optics are like good stews, they take time to cook. If you rush them, they're not as tasty. Patience and understanding are required. Unless it's a Rolls-Royce, a car is guaranteed for only a few thousand miles. When you get down to it, a telescope is guaranteed as long as there's something to hold its mirrors in place. That requires much care and time.

The second requirement is: you must be patient and understanding with your telescope

"The telescope?" you say. "He's crazy." Let's face it, though, most beginners expect too much from the poor things. These people get their start in the primordial ooze of department stores where new recruits are greeted with ads and displays that guarantee their 60mm refractor will reach 1000 power easily. Do you have any idea what that does to a 60mm lens, especially if it's plastic? It makes it nervous. Who can blame it for turning all that light into pudding? And who gets the blame? You guessed it — the telescope.

Immediately, its owner expects a symphony of high resolution to pour through the eyepiece. And if it doesn't seem to happen, then the new recruit will usually get angry and call it horrible names. Some even get violent and slap the tube. Yes, cruelties such as this have been known to happen, horrid as they may seem. Even more horrid is the fact that without giving the poor thing another chance, they box it up and sell it for half price to another amateur who might do the same thing if he's not tough enough with himself.

The third requirement is, you must be patient and understanding with yourself. You can easily become an astroholic if you are now tough on yourself. Remember that moderation is the word. Too much of a good thing, like too much carrot cake can turn you against astronomy really fast. You must learn to be firm with your telescope. Firm. Even if it means walking right up to the storage closet (don't open the door) and shouting, "Not tonight!" And that's final!" It's a harsh thing to do, I'll grant you, and it will earn you some stares of dismay, especially at family reunions, but it is a helpful, cleansing gesture. And it works. Telescopes respect authority.

Amateur astronomy usually does not promise you fame and fortune. All it promises is a chance to travel from one end of the universe to the other in a single night; a marvelous sight seeing adventure for anyone who can't afford a ticket to Hawaii. The universe does not suffer from a sense of obligation to anyone; it is there; it is awesome.

For those who strive to understand it, it will at times grant certain favours. If you are persistent and worthy it will smile down at you and will whisper secrets that only you understand.

That my friends, is when your toughness gains you star stuff!

You wanna know about amateur astronomy? Then get tough!

Cross country

by Heather Peniuk

The McGill Women's Cross-Country team placed 4th at the Canadian University Championships. The team of Nathalie DeLombaerde, Karen Gordon, Sandra Maki, Ingeborg Sacksen, Tania Costanzo, Lorraine McCormick, Heather Peniuk and coach Tom Silletta travelled to Sudbury last weekend to represent the Quebec region.

The treacherous 5 kilometre course was won by Silvia Rueggar of Guelph University in a time of 16:23, but McGill runners were also in the elite pack. Nathalie DeLombaerde of McGill placed 11th in Canada with a time of 17:26 and Karen Gordon placed 19th with a time of 18:06.

Coach Tom Silletta was pleased with the team's results but during the trip when the women's team members jokingly suggested trading underwear with the Quebec men's team for good luck, he remarked, "Mama mia! It's tough being a coach!"

Although cross-country is finished for the year, indoor track season is starting, and interested athletes should contact Currie Gym for information.

Calorimeter

Japanese Sponsor Shuttle Experiment

The Asahi Shimbun, one of Japan's major daily newspapers has signed an agreement with NASA to fly a small "Get Away Special" experiment aboard an orbiting Space Shuttle, possibly in late 1984. The experiment will use the weightless environment of space to make pure artificial snow crystals directly from a gaseous substance.

The experiment was suggested by two Japanese high school students and was chosen from some 17,000 suggestions submitted by Asahi Shimbun readers. It is expected to contribute significantly to present knowledge of crystallography.

The first artificial snow crystal experiment was carried out by a Japanese physicist, the late Dr. Ukichiro Nakaya in 1936. Since then, a variety of follow up artificial snow experiments have been carried out by the Japanese scientists. This will be the first to make artificial snow in a weightless environment.

Get Away Specials are privately funded experimental payloads flown by NASA aboard the Space Shuttle on a first come, first served basis. To date, NASA has accepted 321 Get Away Specials to be flown on a space available basis.

Venetian Blinds

Dramatic new finds about Venus were reported at the first International Conference on the Venus Environment in Palo Alto, California, November 2-6, 1983.

It has been found that Venus' clouds are upside down. There's a smog layer on top, 15 kilometres deep, and Earth like condensation clouds made of sulfuric acid droplets. These condensation clouds are patchy and vary in density. They drizzle but seldom rain very hard and are only ten per cent as thick as terrestrial clouds.

Venus also appears to have had an ocean and lost it to space. During the solar system's early history (when scientist's believe the Sun was 30 per cent less hot), Venus' atmosphere and environment could have been Earth-like. With water abundant, the planet may perhaps have sustained life during the early years of the solar system's history. When the runaway greenhouse effect began, it wiped out most of the exsisting phenomena on the planet and replaced them with today's furnace-like environment.

The case of the missing mass

Researchers studying long-lived subatomic particles inadvertantly have produced an indirect test for neutrino mass.

Scientists now think neutrinos lack both mass and electrical charge. But some theorists suggest that if neutrinos have mass then one of the great cosmological questions might be answered: Is the universe open or closed?

Physicists now suggest that the universe is, "open" since they haven't found enough matter for gravitational attraction to pull together everything that was thrown out as a result of the "Big Bang."

However, if neutrinos have mass, then this could account for the missing mass needed to "close" the Universe.

Bill Reay, physics professor at Ohio State University and spokesperson for a collaborative project at the Fermi National Accelerator Laboratory near Chicago says, "New experiments using neutrino addition to produce charmed particles may show that neutrinos do have mass."

UNISPACE 83

Last August, Canada took part in UNISPACE 83, an important United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Canada, an active country in the field, was represented by a number of federal agencies.

The conference was attended by 1500 delegates from 100 countries and addressed itself to two difficult problems: the militarisation of outer space and the disproportionate use of geo-stationary orbits by industrialised nations.

The growing threat of military vehicles in the Earth's space environment, which many fear will become the next battleground of the superpowers, was a recurrent theme throughout the conference. In this, there was a sharp division between industrialised and Third-World countries; the latter lost a motion to prohibit the military uses of space, including antisatellite satellites, laser cannons, and other instruments of destruction.

The participants of UNISPACE 83 agreed on a thick, rather vague document aimed at mediating international disputes over the use of space, with a statement of concern that major powers must develop a sense of moral responsibility to match their technical know-how.

by Keith Janzen

CLASSIFIEDS

Ads may be placed through the Daily, Room B03, Student Union Building, 8 a.m. to 2 p.m. Deadline is 2:00 p.m. two weekdays prior to publication.
McGill students: $2:50 per day; for 3 consecutive days, $2.00 per day; more than 3 days, $1.75 per day. McGill faculty and staff: $3.50 per day. All others: $4:00 per day. *Exact change only, please.*
The Daily assumes no financial responsibility for errors, or damage due to errors. Ad will re-appear free of charge upon request if information is correct due to our error.
The Daily reserves the right not to print a classified ad.

341 — APTS., ROOMS, HOUSING

Available now for season, 3 bedroom, furnished, fireplace, Lake Memphramagog. $175 per month. Nov.-April. 352-6847 evenings. 1-819-843-6305 weekends.

Eastern Townships weekend holiday farm house group requires 4 new members for season. Skiing, walking, good food, pleasant company! Beginning skiers welcome. 352-6847 evenings.

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Wanted - Person to share 4 1/2 on Lorne Ave. $225 December 1 to July 31. 15th floor, panoramic view. Mark 281-1817.

Sublet December 1 Large 5 1/2 Ste. Famille. Excellent condition, back yard included. Washer, dryer, dish washer. $475.00 heated. Chris 843-6408 after 7 pm.

343 — MOVERS

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358 — WORK WANTED

Magic for all occasions — Christmas, birthday parties, special events, and stage shows. 5- to 55- minute shows. Phone Daniel at 667-8060 (after 6 PM).

361 — ARTICLES FOR SALE

For sale: bar-bell and 75 lbs of weight, $30.00; Artley flute, good condition $175.00. Call Alison at 843-7739, pref. evenings.

Must Sell! Timex/Sinclair 1000 computer & 16 K RAM expansion module & Timex/Sinclair 2040 printer. Only 1 month old, guarantee. Original $300. Sacrifice for $160. 932-6012.

Superscope tape cassette deck by Marantz. PORTABLE. Perfect condition, excellent recording quality, three head system, Dolby, uses batteries or plug. Worth $400.00 Asking $220.00. 844-8549.

Desks, Chairs, cabinets etc: used & new: Bargin prices: Also open Saturdays AM: 207 St. Antoine Street East. Tel: 866-6611. Michael Miller.

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PENTAX MV automatic 35 mm SLR camera with pentax 50 mm, f2 lens and case. Two years old — hardly used. Asking $150 (New: $220) Call 989-5103.

"10,00 Different Original Movie Posters. Catalogue $2.00. Mnemonics Ltd., Dept. "H", no. 9, 3600 21 St. N.E., Calgary, Alta. T2E 6V6."

Wool army, navy, airforce great coats — $39.95; army parkas — $60.00 (for -65°F) Korean police jackets lined $40.00. EXXA 1210 St Denis.

372 — LOST & FOUND

LOST — A 10 K gold, square-link bracelet on Fri. Nov. 4. If found, please call Carleen at 366-9197. Thank you.

374 — PERSONAL

Sweetie B. Randal head Happy 3rd and lots more to come. Love always K. Cutie.

385 — NOTICES

Beer? Sounds good, tastes better? Why not try making your own and enter the KRT BEER BREWING CONTEST? For more info, phone 286-0830.

Editing, proofreading: — Theses, term papers, C.V.'s/resumés, promotional blurbs, etc. Reasonable rates. Call 270-5901, afternoons or evenings.

FREE LECTURE: How to inprove and build a super memory. Sunday evening at 7:00 P.M. 1538 Sherbrooke Street West, Suite 710. Please reserve by calling Dr. Nathan Schiff at 935-7755.

MICROCOMPUTER USERS — If you own or use microcomputers, and like to contact others with similar interest, participate in this microcomputer user-survey. Call 849-3091 after 8 p.m.

389 — MUSICIANS WANTED

Musician(s) wanted — to play at a Gardner Hall "Coffee House" in late November, possibly again later in the year. 1-2+ hours — call Morgan. 286-0902.

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Ed-board people: come meet the Christmas/1984 special issue editors
Amy, Leela, Denise, and Mark would like your help — general planning, story ideas, production/design ideas, etc.
Today at 3:00 pm

Come to the marathon
STAFF MEETING
L'edition Françcais, election of CUP national conference delegates, P & P report, and the CUPBEQ regional in Lennoxville.
Thursday at 2:00 pm

Highly motivated, success-oriented individuals wanted to form viable media production organisation (Theater, Film, T.V.) Persons with experience in:
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13H00 TO 16H30

at the Faculty of Law
Old Chancellor Day Hall
3644 Peel Street (Peel Metro)

Members of Faculty, recent Graduates and McGill Law students will be on hand to answer questions about the study of Law at McGill and to discuss careers in law with interested visitors.

INTERNATIONAL STUDENTS WEEK '83
TODAY: MIDDLE EASTERN & ASIAN DAY

Union 107/108 10:30am-4:30pm	Exhibition, Arts & Crafts Slides Shows, Food Sales By: INDIAN STUDENTS ASS'N LEBANESE STUDENTS ASS'N VIETNAMESE STUDENTS ASS'N PAKISTAN STUDENTS ASS'N
RM 107-108 6:30pm	'KAFENEIO', Coffee Shop By HELLENIC ASS'N

* Free admission to above events.

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Nov. 20: 10am-5pm

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**SATURDAY,
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At The Sir Arthur Currie Gymnasium Located at 475 Pine Avenue West.

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REDMEN
vs
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**SATURDAY,
NOVEMBER 19
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